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ABSTRACT

This handbook provides assistance with developing evaluation instruments for inservice teacher education components in the Pasco County School District. Its purpose is to facilitate compliance with 1983 Florida legislation requiring the reporting of inservice teacher education attainment data based on measurable objectives. The handbook contains instructions for: (1) writing instructional objectives which define specific competencies in terms of learner outcomes; (2) identifying the inservice component type to determine the appropriate instrument; (3) developing achievement tests for component types I and V (item construction, item selection, and test form); (4) developing rating scales for component types II-IV and VI (writing items, physical appearance, reliability and validity); and (5) submitting instruments to the Department of Research and Evaluation Services for approval. The appendix contains definitions for the six inservice component types. (BS)

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INSERVICE EVALUATION HANDBOOK

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January, 1985

DEPT. OF RESEARCH
AND EVALUATION
SERVICES

This handbook was developed to facilitate compliance with new evaluation procedures for inservice. While the responsibility for evaluation lies with the component coordinator, the Department of Research and Evaluation will provide assistance wherever possible. Address evaluation questions to:

Madeline Barbery, Ph.D.
Specialist, Program Evaluation Services
Department of Research and Evaluation
District School Board of Pasco County
7227 U.S. Hwy 41
Land O'Lakes, Florida 33539

Phone Number: (813) 996-3600 ext. #338
Suncom Number: 597-1338

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I. INTRODUCTION

Recent legislative changes have significantly impacted the evaluation of inservice components. According to Florida Statute 231.608, attainment data based on each component's measurable objectives must be reported. This requirement places the emphasis on outcome in terms of participant learning.

Several steps have been taken to facilitate evaluation of inservice components consistent with Florida law. In the fall of 1983, directors and supervisors were asked to categorize each unit of their inservice components in accordance with one of seven types of inservice (see Appendix A). An appropriate evaluation procedure designed to provide evidence of the increased knowledge and skill of participants was then identified for each type of inservice.* These activities culminated in the generation of an inservice classification system with a concomitant evaluation strategy.

The purpose of this handbook is to provide assistance with the development of evaluation instruments for inservice components. Clearly stated and measurable objectives are fundamental to this process. In order to establish that an inservice component is effective in terms of participant outcomes, the measurement instrument(s) must assess attainment of the measurable objectives. A review of writing objectives is, therefore, warranted.

*Type seven, "other" category, was dropped as a viable category.

II. WRITING INSTRUCTIONAL OBJECTIVES

Inservice education is designed to increase competencies needed by educational personnel to perform their assigned duties (or duties to be assigned). Objectives define the specific competencies to be gained by participants in a given inservice component. As such, objectives describe or imply the sort of test that should be used to evaluate the component. In fact, the most sensitive means for detecting inservice effects involves constructing a test custom-fitted to component objectives.

Statements of objectives convey the type of behavior expected relative to a given content. They should be clearly stated in measurable terms. Typically, well-formulated objectives adhere to the following principles:

A. Objectives describe learner behaviors (outcomes/ends), not instructor behaviors (means). Participants engage in certain learning activities in order to attain specific competencies. Objectives identify what will be learned, not how it will be learned.

Since an objective specifies an observable learner response, the verb must serve as an indication of the expected response. In other words, the verb in an objective must denote an action.

Avoid the following verbs:

know	appreciate	enjoy
understand	comprehend	distinguish
demonstrate	identify	

Use verbs such as:

write	list	build
choose	sort	compare
recite	point to	volunteer

Example: Component coordinators will write inservice component evaluation instruments.

B. The content to which the behavior relates is stated in the objective. Behavior is exhibited toward an object (content). If the content is omitted, we know how the learner is to respond or act, but in regard to what?

Discussion: In the example for principle #1 above, the content is "inservice component evaluation instruments". It tells us what the component coordinators will write.

C. Any learning conditions that restrict or otherwise influence expected performance should be stated in the objective. Specification of the materials, data, equipment or other "givens" which are to be utilized or withheld adds clarity to the objectives. However, learning conditions restrict the new behavior to specific situations. Since this limits generalizability of the newly acquired behaviors, learning conditions are necessary only when they are crucial to performing the new behaviors.

Example: With the aid of a handbook, component coordinators will write inservice component evaluation instruments.

Discussion: The learning condition specifies that the behavior may occur with the aid of a handbook.

D. A level of proficiency (criteria of acceptable performance) should be included in the objective when a certain degree of skill in performing the behavior must be attained for instruction to be considered satisfactory. However, if there is not a good rationale for selecting a proficiency level, it is best omitted.

Example: With the aid of a handbook, component coordinators will write valid and reliable evaluation instruments for their respective inservice components.

Discussion: The evaluation of inservice components can only be as accurate as the data collected. High-quality measuring instruments must be valid (measure what they were intended to measure) and reliable (consistent in what they measure).

The format below may be helpful in writing objectives. By first identifying the important parts of a well-written objective, development of the objective statement is facilitated.

Behavior: _____
Content: _____
Learning Conditions: _____
Level of Proficiency: _____

Objective Statement: _____
_____
_____

III. IDENTIFYING INSTRUMENT TYPE

Appropriate product evaluation procedures for each type of inservice component are identified in Appendix H of the Master Inservice Plan Procedures Manual. Basically, the designs call for two types of instruments - achievement tests and rating scales. In other words, if a component is identified as Type I or V, the evaluation instrument must be an achievement test. Similarly, if a component is identified as Type II, III, IV, or VI, the evaluation instrument must be a rating scale. The focus or content of the instrument (what is measured) will vary contingent upon component classification, but the nature of the instrument (how you measure) is fixed.

Both types of instruments rely on well written objectives. However, the specific procedures for developing an achievement test differ from those for developing a rating scale.

Therefore, it is important that the component coordinator determine the type of instrument required for his/her component and follow the steps pertinent to that type.

IV. DEVELOPING AN ACHIEVEMENT TEST

Inservice components requiring pre- posttest evaluations are concerned with measuring the knowledge gained by participants. There is a direct relationship between this measurement and the instructional objectives written for the component. The objectives provide the basis for item construction, difficulty level, and test form.

Writing Items for Instructional Objectives

Product evaluation is concerned with measuring goal attainment. As such, evaluation relies heavily upon the clear delineation of program goals. Objectives describe the behavior that program participants should evidence at its conclusion as proof that they attained program goals. Objectives, therefore, clearly suggest the actual content of a test.

To develop an instrument highly sensitive to program effectiveness follow the procedures described below. They will aid in the construction of a test which is custom-fitted to the objectives of the inservice.

A. Identify the purpose(s) of the inservice. These broad program goals communicate the desired outcome of the inservice component. They are formulated on the basis of identified needs.

Component Goals: _____
_____
_____

B. List the participant behaviors (action verbs) that will show evidence the inservice has accomplished its goals.

Behaviors: _____ _____
_____ _____
_____ _____

C. Write learner objectives for the component consistent with the principles for writing objectives discussed in the previous section of this handbook.

Behavior: _____
Content: _____
Learning Conditions: _____
Level of Proficiency: _____

Objective Statement: _____
_____
_____

D. Develop an outline of the content to be presented in the inservice. This will help ensure that the test items match the range and depth of the content presented.

Component Topic: _____
Sub-topic A: _____
Skills hope to teach: _____
_____
_____

Sub-topic B: _____
Skills hope to teach: _____
_____
_____

E. Write items that are responsive to the learner objectives (#3) and the content (#4) of the inservice component. Remember that the reliability of a test is closely related to the number of items the test contains. A reliable test of a single objective should contain at least three items - ideally, five.

Like well-formulated objectives, well-written items adhere to certain rules:

1. The item should include a response description. In other words, the expected learner behavior **AS SPECIFIED IN THE OBJECTIVE** should be identified.

   Example: In the objective developed earlier in this handbook, the response description is: write. Therefore, an acceptable test item would be: Write an evaluation instrument.

2. Include the content limits in the item. This helps the respondent focus on a particular range of content. The content limits should define the set of content to which the learner objective is relevant.

   Discussion: In the objective on writing evaluation instruments, the content limits identify "for their respective inservice components" as the relevant content.

3. Frequently, the item format is included in the item statement. This is simply a further elaboration of the information provided in the response description. In our example, the student will write. The item format is writing (production of an evaluation instrument). In other instances the student might be asked to "circle one of the four response options".

4. In instances where the item requires learners to produce the answer rather than selecting from an array provided by the item writer, item criteria should be included . This informs students of the standards which their responses must meet.

Example: The criteria for the evaluation objective were that instruments be both valid and reliable.

A format similar to the one for writing objectives facilitates item writing:

Response Description: (identifies learner behavior)
Content Limits: (part of content you're testing)
Item Format: (how students are to respond)
Criteria: (standards for evaluating perormace)

Item Statement: (incorporates all of the above)

The interdependence of item content and learner objectives cannot be over-emphasized. To highlight the nature of the relationship, an item statement for the objectve on writing evaluation instruments is developed below:

Learner Objective: With the aid of a handbook, component coordinators will write valid and reliable evaluation instruments for their respective inservice components.

Item Development
Response Description: write
Content Limits: their respective inservice components
Item Format: write (produce a written work)
Criteria: valid and reliable

Item Statement: With the aid of your handbook, write valid and reliable evaluation instruments for your inservice components.

Refining Items

Items should be reviewed and "polished" prior to inclusion in the evaluation instrument. Whenever possible, have at least

one other person judge the clarity and comprehensiveness of the items. The following systematic approach for reviewing items may prove helpful. Each item should be checked for:

1. Clarity - Is the intent of the item clearly obvious?
2. Vocabulary - Is the wording appropriate for those who must respond to the item?
3. Content - Does the knowledge or performance required by the item match what is stated in the objective?
4. Format - Does the format correspond to the format used in the inservice?

Items as Part of A Larger Whole

Thus far, items have been developed and reviewed independently of each other. This process, in effect, treated all items (and, therefore, all objectives) as equally important. However, in practice, some learner objectves are more critical to attainment of the overall inservice objectives. The evaluation instrument must be sensitive to priorities among objectives.

In developing the evaluation instrument it is important to select items that reflect program emphases and intended outcome skill levels. The number and scope of items included per objective should vary consistent with the priority and skill level attached to the objective.

From the group of items developed for each instructional objective, select those which best meet the criteria discussed above for inclusion in the evaluation instrument. Looking at the items collectively, ask:

1. Do they reflect the levels of skill attainment the inservice hoped to produce? Too often test items assess

the lower level skills or knowledge and comprehension, whereas most programs seek to develop various skills at different levels of attainment.

2. Is the distribution of items proportionate to the priority of objectives? In other words, are the component's major emphases reflected in the nature and number of items representing them, or are all objectives (major and minor) equally represented?

3. Do the items measure what needs to be measured? This question addresses the issue of validity. One aproach to assessing test validity is to have expert judges (at least two others knowledgable in the field) review the test. Given a definition of the construct being measured, they should independently examine the test for representativeness of content, skills assessed, clarity and vocabulary.

4. Will the items yield similar results if the same students are tested again on them? Statistical evidence of consistency is required to prove reliability. Similarity among items (how well correleated they are) or between scores on subsequent administrations of the test are ways of demonstrating reliability.

Affirmitive responses to the questions above indicate a respectable evaluation instrument has been developed. If weaknesses are noted, make the necessary modifications before proceeding.

Test Form

Test form pertains to the method of indicating responses. It is difficult, if not impossible, to write good test items without attention to how the learner must respond. In fact, the rules for item writing (presented earlier in this handbook) include a response description and item format as part of the item statement. An acceptable practice in test development is

to remove these response indicators from the individual items and place them at the beginning of the test under "directions".

Achievement tests may take many forms. Selection of a particular test form is based on the inservice's specific objectives and knowledge of the strengths and weaknesses associated with each form. Three forms deemed appropriate for inservice evaluations are discussed below.

True - False Form

When properly constructed, a true - false test can measure both factual knowledge and understanding of important concepts. Since the items are simple declarative statements, a true - false test is relatively easy to construct. In addition, sampling a broad range of material is possible with this form.

Perhaps the greatest shortcoming of the true - false form is its susceptibility to the element of chance. Since there are only two alternatives, a correct response may be due to guessing rather than knowledge. The effect of this guessing factor is to limit the test's ability to discriminate as well as other forms between good and poor students.

Tips for Construction of the True - False Form

1. Each item statement should be either entirely true or entirely false.
2. The item statement should be concise and self-contained in meaning. It must depend on content, not context, and be free of unnecessary elaboration.
3. Item statements should not be direct quotes from lecture or printed materials. Since rote learners can recall

information without necessarily understanding it, failure to modify item wording could yield results similar to guessing.

4. To avoid interpretive problems, quantitative terms should be used rather than qualitative terms, whenever possible. For example, the term several may be interpreted as a different quantity by different readers. Therefore, an item such as -"Several test forms are discussed in the handbook." - is better written as - "Three test forms are discussed in the handbook."

5. Specific determiners (e.g., all, sometimes, always, etc.) which give a clue as to the correct answer should be avoided.

6. Negative statements (especially double negatives) should be avoided since they are frequently misread.

7. The proportion and arrangement of true items and false items should be consciously varied.

Short - Answer Form

Like the true - false form, the short - answer form is relatively easy to construct. It may be comprised of questions, fill-in-the-blanks (incomplete sentences), definitions, or identification items. This form is particularly well suited to measuring objectives which indicate the learner is to know, recall, recognize or identify.

Despite its strengths in measuring factual recall, ability to assess a large sample of information, and reduction of guessing, the short - answer form has several weaknesses. Constructing items that call for only one correct answer is a difficult task which tends to limit measurement with this form. Another weakness involves the tendency of completion - type

items to stress rote recall, thereby encouraging learners to spend their time memorizing details rather than understanding the material.

Tips for Construction of Short - Answer Form

1. Omit only significant ("key") words in incomplete - statement items.
2. Provide enough clues in the item so that the pupil who knows the answer can supply the correct response. (Note: Too many clues "give away" the correct response while too few may lead to misunderstanding the type of response desired.)
3. Avoid the use of grammatical clues to the correct answer.
4. Leaving too many blanks in a single statement obscures meaning. Avoid this error.
5. The space (blanks) provided for responses should be of sufficient length and uniform. Avoid giving clues such as a short blank for a short response.
6. Each blank should be awarded equal point value (weight) in determining the total score. This requires that each word or phase omitted be of comparable importance and difficulty.
7. Word the items so as to limit the length of the responses to single words or short phases. (Note: When longer responses are possible, the chances for divergent responses increase.)
8. Avoid verbatim quotes. Since short - answer tests tend to stress rote memory, verbatim quoting only serves to emphasize this weakness.
9. Prepare a scoring key with all acceptable responses **IN ADVANCE.**

Multiple - Choice Form

Most test experts consider the multiple-choice test to be the best type of objective test. It can be used to measure each level of the cognitive domain - knowledge, comprehension, application, analysis, synthesis, and evaluation. Guessing is less prevalent than in true-false tests, but more so than in short-answer tests. Like these two forms, the multiple-choice test is capable of measuring a broad range of material.

The difficulty of constructing good items is this form's most serious weakness. Developing good items to measure the higher levels of learning is particularly difficult and tends to limit use of the form's real potential. The net effect is that those constructing tests use multiple-choice items to measure lower level objectives which might be measured using other more easily constructed objective forms.

Tips for Construction of the Multiple - Choice Form

1. Make only one choice justifiable by stating the central problem of the item in the premise.
2. All choices should be grammatically correct endings for the premise.
3. Make choices as brief as possible and similar in length.
4. Avoid a pattern of answers by randomly distributing the correct choices.
5. Avoid stating items negatively.
6. Avoid creating ambiguous items by limiting:
    a. one problem per item
    b. the use of unnecessary or unusual words

7. Reduce guessing by making all choices plausible. Homogeneous choices increase item difficulty.

8. Avoid specific determiners which may provide a clue as to the correct choice.

9. Avoid interrelated items. Have each item contain an independent problem which gives no clue to the answers of other items.

Recommendations

Since multiple-choice tests offer extensive measurement sampling at all levels of the cognitive domain, it is the recommended form for evaluation of Type I and V inservice components. While it is possible to combine forms within one instrument, the majority (at least 75%) of the items should be multiple-choice. Furthermore, this approach of combining forms has implications for scoring which must be addressed prior to test development.

It is important that tests be short enough to be practical, yet long enough to be reliable. The reliability of a test can be increased by increasing the number of items. For inservice evaluation, it is recommended that tests be comprised of no fewer than 20 items - preferably 30.

V. DEVELOPING A RATING SCALE

Type II, III, IV, and VI inservice components require evaluation of participant performance on specific tasks. Task performance includes two measurable aspects: (1) the procedure, skill, or technique used and (2) the end product or result.

Both products and procedures are important learning outcomes. For the purpose of inservice evaluation, measurement of individual participant learning directs attention to assessment of procedural aspects. Each participant's contribution to the group process of product development must be assessed.

Rating scales are useful tools for assessing performance procedures. They help focus the attention of the evaluation on crucial elements of the procedure, thereby increasing the reliability of the evaluations. Considerable planning must precede the actual construction of performance tests.

Planning the Test

Writing instructional objectives was covered in an earlier section of this handbook. Once again objectives are the key since desirable performance is constituted by specific kinds of desirable learner behavior. In planning the test it may be necessary to break the objectives down into more specific sub-objectives. Other important steps include:

1. Examining the content areas to be presented and priority of objectives. This will help ensure adequate coverage of the range and depth of content.
2. Analyzing the desired performance to determine the necessary elements of the procedure as a basis for measurement. The scale's validity is contingent upon how well the performance is broken down into its important elements. The most representative elements become the actual content of the rating scale.
3. Noting any special dimensions or conditions pertinent to the desired performance. Whenever possible, identify and assess these aspects of performance.

Writing Items

The items on a rating scale may range from single words to complete statements. Clarity of meaning is the deciding factor. Other important considerations include:

1. Writing items such that each element of the performance is rated independently of the others.
2. Providing gradations within the response alternatives. The number of gradations should be determined on the basis of the degree of discrimination desired and/or possible. (Remember that reliability increases with increases in the number of gradations up til around 7 gradations.) A decision must be made as to whether an even or an odd number of gradations is preferable. Use of an odd number permits a "neutral" or "average" rating, whereas use of an even number forces the rating toward one or the other scale type.

Physical Appearance of the Scale

While not one of the primary concerns in scale development, the physical appearance of the scale also warrants consideration. A rating scale may be presented graphically:

Inferior Quality or Performance — — — — — Outstanding Quality or Performance
1 2 3 4 5

Frequently, however, the numbers are defined at the top of the page and written opposite the behaviors to be rated, as in the following example:

Use the key below to rate each item on the scale:

1 = Inferior

2 = Slightly Below Average

3 = Average

4 = Slightly Above Average

5 = Outstanding

Circle the appropriate number to indicate your rating:

1	2	3	4	5	1. Extent to which solution generated showed creativity.
1	2	3	4	5	2. Thoroughness of proposed solution strategy.
1	2	3	4	5	3. Feasibility of the proposed strategy.

Reliability and Validity

Whether a rating scale is completed by the participant (self-rating) or an observer, it is a subjective measure. Use of a rating scale, however, makes measurement more reliable since it focuses the attention of the rater on specific elements of the performance. The extent to which distinctions between scale gradations (points) are clearly defined will also enhance the reliability of the scale. In other words, if the rater has a clear understanding of what constitutes above average performance as opposed to outstanding performance, consistency of measurement (reliability) will be increased.

Validity is concerned with how well a scale measures what it

is supposed to measure. As previously mentioned, the validity of the rating scale is dependent upon the scale developer's ability to identify all the relevant elements of the desired performance. This is both the most difficult and most crucial step to scale development. It is, therefore, important to stress that the goal is to identify those specific aspects of the behavior which are crucial to its performance. Scale validity will be negatively affected (decreased) should the breakdown reach a level of specificity which leads to the measurement of trivial elements.

IV. SUBMITTING INSTRUMENTS FOR APPROVAL

All inservice evaluation instruments must be submitted to the District Office, Department of Research & Evaluation Services for approval. Instruments must be received no later than <u>two weeks</u> prior to the first offering of a component. They must be accompanied by:

1. A list of specific learner objectives.
2. An outline of the inservice's content.
3. A description of the delivery format (lecture, discussion, "hands-on", etc).
4. An identification of the target group (recipients of the inservice).
5. The delivery date (when the inservice will be held).

EARLY SUBMISSION OF EVALUATION INSTRUMENTS ALLOWS TIME FOR FINAL REVIEW/APPROVAL, ANY NECESSARY MODIFICATIONS, AND DUPLICATION.

APPENDIX A

Categorization of Inservice Components

District School Board of Pasco County

2609 U.S. Hwy. 41 North Land O' Lakes, Florida 33539

Thomas E. Weightman
Superintendent

Ralph H. Martin
Supervisor of Personnel

	Contact Person
Name:	Ralph Martin
Phone:	996-3600 x-346

SOP-022-83

September 8, 1983

TO: Directors and Supervisors

FROM: Mary Giella, Assistant Superintendent for Instruction MG
Ralph Martin, Supervisor of Personnel RM

SUBJECT: Analysis of Inservice Components

In preparation for a D.O.E. inservice visit, I would appreciate your analyzing each unit of the components for which you are responsible and categorizing your units in accordance to the following definitions:

NUMBER	DEFINITION
1	The unit is designed to motivate participants by providing them with ideas and/or information about a subject or trend. It is inspirational in tone. Individual participant measurement of learning is not practical; therefore, not done. If done, the measurement is forced. Group participant progress can be described.
2	The unit is designed to get a group of participants together to share ideas (brain storm) about a topic in order to assimilate the ideas received from unit #1 type activity. Individual participant measurement of learning is not practical; therefore, not done. If done, the measurement is forced. Group participant progress can be described.
3	The unit is designed to compare the information assimilated from units #1 and #2 to existing conditions in order to determine needs. Individual participant measurement of learning is not practical; therefore, not done. If done, the measurement is forced. Group participant progress can be described.

NUMBER	DEFINITION
4	Once units #1, #2, and #3 types have been done, the purpose of unit #4 is to plan. Individual participant measurement of learning is not practical; therefore, not done. If done, the measurement is forced. Group participant progress can be described.
5	The unit is designed to provide personnel training in order to implement a plan. The performance skills are identified, and strategies to teach the skills are designed. Individual participant measurement of learning is practical and can be done. Group participant progess can be described.
6	The unit is designed to review and evaluate activities described in units #1 - #5. The purpose is to modify the steps described in units #1 - #5. Individual participant measurement of learning is not practical; therefore, not done. If done, the measurement is forced. Group participant progress can be described.
7	There is a purpose for the unit other than what is described in #1 - #6. Please describe the purpose of the unit.

Please use the attached form to respond.

DEADLINE - OCTOBER 14, 1983.

bn
Attachment

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